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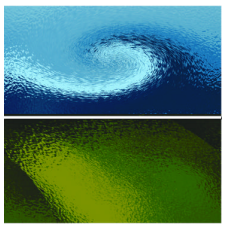

RESEARCH ARTICLE

Preliminary data on the macrozoobenthos of the Albanian coastal lagoons (lagoons of Patok, Karavasta, Narta)

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Abstract

1 - Macrozoobenthic community of three Albanian coastal lagoons (Patok, Karavasta, Narta) has been studied during 2004 – 2005.

2 - A relatively low number of taxa (40) have been identified

3 - Quantitative assessments, seasonal variations and distribution of the macrozoobenthic community within each lagoon have been analyzed.

4 - There is a slight difference in species number between lagoons, but a considerable difference in species composition between Patok and the two other lagoons.

5 - Preliminary results show a higher uniformity in the distribution of macroinvertebrates in Karavasta Lagoon. The highest seasonal variations in species composition and density have been recorded in the western parts of the lagoons.

Introduction

The studies on the macrozoobenthos of Albanian lagoons are relatively new and the level of knowledge is limited. Majority of the studies has been carried out on molluscs in taxonomic and ecological aspects and the main publications belong to Beqiraj 2001, Beqiraj *et al.* 2002, Beqiraj 2003, Beqiraj & Sulejmani 2003, Beqiraj 2004, Beqiraj *et al.* 2005, Beqiraj & Laknori 2006. General surveys on the macrozoobenthos of the Lagoon of Karavasta have been published by Casellato *et al.* 1997 and Nonnis Marzano *et al.* 2003. Preliminary results on oligochaetes and sponges have been published respectively by Casellato *et al.* 1999 and Mercurio *et al.* 2002. Many groups remain still unstudied.

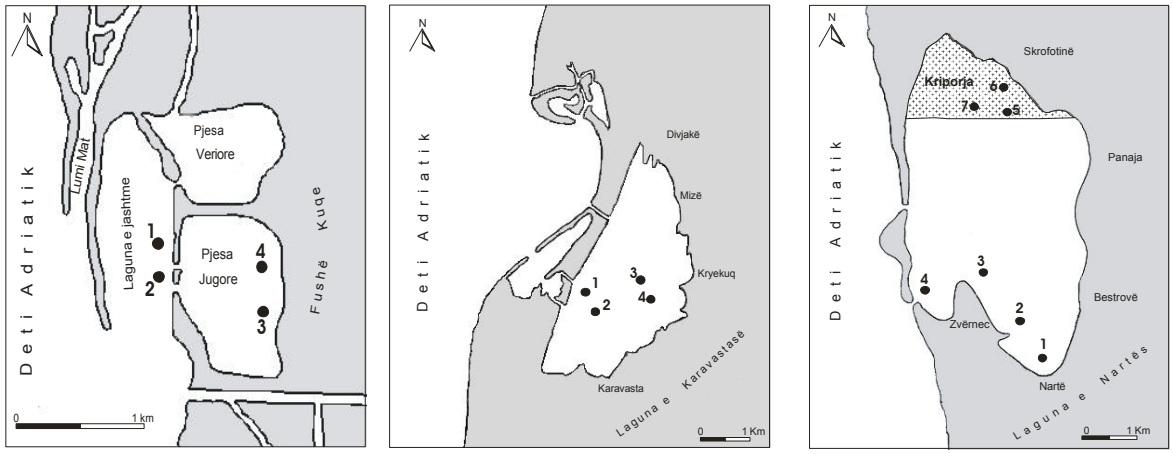
The present study has been carried out in the framework of the CADSES Project (Interreg III B). Results presented in this paper refer to the data collected by the box-corer sampling. This paper gives preliminary data on species composition of macrozoobenthos guilds in three Albanian lagoons, quantitative assessments, seasonal variations and distribution of these guilds within each lagoon. Data on Polychaeta, Oligochaeta, Amphipoda, Isopoda and Chironomidae are recorded for the first time for the lagoons of Patok and Narta.

Methods

Sampling

Sampling has been carried out in November 2004 and April 2005 in three Albanian lagoons: Patok, Karavasta and Narta (Fig. 1). In the lagoon of Patok (surface 480 ha) samples have been taken in 4 stations (Fig. 1A), in Karavasta Lagoon (surface 4200 ha) also in 4 stations (Fig. 1B), while in Narta (surface 3500 ha) samples have been taken in 7 stations (Fig. 1C),

including also 3 stations in the Saltpan (surface 1500 ha).



A B C

Figure 1. Lagoons of Patok (A), Karavasta (B) and Narta (C) with the sampling stations.

In Patok, in the stations 1 and 2 the habitat type was mud without vegetation, at 0.3 m depth. In the stations 3 and 4 the habitat type was mud and sand with submerged macrophytes, at 0.6 m depth. In Karavasta Lagoon, in the stations 1 and 2 the habitat type was mud with macroalgae, at 1 m depth, while in the stations 3 and 4 the habitat type was mud without vegetation, at 1.5 m depth. In Narta, sampling followed the salinity gradient. The habitat type was mud without vegetation in all stations. Stations 1, 2 and 3 were at 0.5 m depth, stations 4 and 5 at 0.4 m depth, while stations 6 and 7 were at 0.25 m depth.

The average depth of Patok Lagoon is 0.7 m, while in both Karavasta and in Narta average depth is 0.8 m (Table 1). Samples have been taken using a manual box-corer 17 x 17 x 15 cm.

Table 1. Values of the main abiotic parameters in the sampling stations of Narta Lagoon**.**

November 2004

Station	Temper. (°C)	Salinity (‰)	Dissolved O_2 (mg/l)	pH
1	6.86	37.58	11.23	7.88
2	6.90	37.64	12.06	7.96
3	7.01	40.18	11.79	8.08
4	6.32	42.18	12.31	7.92
5	6.33	42.24	12.50	7.91
6	7.50	54.17	10.16	8.04
7	6.90	54.30	10.26	7.97

April 2005

Station	Temper. (°C)	Salinity (‰)	Dissolved O_2 (mg/l)	pH
1	16.8	26.05	6.55	7.94
3	17	27.85	6.79	8.81
4	15.85	33.64	7.08	9.03
6	24	49.6	9.72	9.32

Quantitative assessments

Several simple quantitative assessments have been made, based on the collected data on macrozoobenthic animals, such as: density (number of individuals) for each species in each sample; variations of species composition and species density between stations; seasonal variation of species composition and species density in each station. Comparisons between lagoons have been made based on these assessments and the similarity coefficient (i-Sokal & Sneath) between stations and lagoons has been evaluated, based on the species composition (after Blanc *et al*. 1976) :

$$i = \frac{s}{s + 2(u + v)}$$

Results and discussions

In the three lagoons a total of 40 taxa have been identified at three different level of taxonomic resolution: species, genera, family (Annex 1). If the determination would have been able to go up to species level for each taxa (especially for annelids and crustaceans), the total number of species would have been much higher.

As shown in Annex 1, the taxa found in the three lagoons belong to molluscs (Gastropoda and Bivalvia), annelids (Polychaeta and Oligochaeta), crustaceans (Isopoda, Amphipoda and Decapoda), cnidarians (Anthozoa), nematodes (Enoploida) and insects (Diptera) in larval stage. The number of taxa is almost the same in each lagoon (20 in Patok, 20 in Karavasta and 22 in Narta).

Taking into account the general composition of benthic community for the three lagoons in total, 50% of the macroinvertebrates are molluscs, 27% annelids, 16% crustaceans and 7% are chironomids, nematods and cnidarians all together.

In Patok Lagoon there is a very slight difference between species number among molluscs, annelids and crustaceans, respectively 32%, 31% and 27% of species composition of the macrozoobenthic community, while 10% belong to Diptera and Nematoda. Bivalves, oligochaetes and polychaetes have the highest species number in this lagoon.

In Karavasta Lagoon molluscs have an emphasized dominance with 60% of the macrozoobenthic guild, 25% are annelids, 10% crustaceans and 5% are chironomids and cnidarians. Gastropods have a high species number (9) compared to the other groups and they are followed by the bivalves with 5 species.

In Narta Lagoon, the composition of macrozoobethic community looks similar to that in Karavasta, with 50% molluscs, 36% annelids, 10% crustaceans and 4% chironomids. The highest species number has been recorded again for gastropods with 8 species.

Species with the highest presence in the three lagoons were bivalves Cerastoderma glaucum and Scrobicularia cottardi, gastropods Ventrosia ventrosa, Cyclope neritea and Pirenella conica, oligochaetes Haplotaxidae and Tubificidae, amphipods Gammarus sp. and polychaetes Nereidae.

Generally, species with the highest presence had the highest density, too, in all lagoons. There are also several species, which have a high presence, but a low density, such as molluscs Pirenella conica, Pusillina lineolata, Loripes lacteus and annelids Lumbricidae, Syllidae and Nephtyidae. Preliminary considerations show that the highest density for filter-feeder species has been found in Spring, while for detritivore species in Autumn, but this should be finally confirmed by further data collection.

Species distribution within each lagoon has been analyzed. In Patok 55% of taxa were present in 75% – 100% of the stations, in Karavasta 43% of taxa were present in 75% – 100% of the stations, while in Narta 27% of taxa were present in 57% - 72% of the stations. So, Narta present a special case compared to the other two lagoons. None of the taxons in Narta was present in more than 72% of the stations. These results show a lower uniformity of

species distribution in this lagoon because of the abiotic gradients, especially salinity.

The similarity coefficient between sampling stations in each lagoon has been assessed. In Patok the values of similarity varies 33% - 66%, in Karavasta 33% - 44%, while in Narta 0% – 37% and for 4 pairs of stations in this lagoon the similarity coefficient is zero. This is due to abiotic gradients in Narta Lagoon. Low variation of the similarity coefficient between stations in Karavasta demonstrates a higher uniformity in the distribution of macroinvertebrates in this lagoon.

The assessments of similarity coefficient between lagoons show a high similarity between Karavasta and Narta (56.3%) and a low similarity of these two lagoons with Patok, respectively 9.4% between Patok and Karavasta and 20% between Patok and Narta.

Seasonal variation of species number is relatively low. 28 taxa (70%) have been found in both sampling seasons, Spring and Autumn. 5 taxa have been found in Spring only (Condylactis aurantiaca, Pusillina marginata, Haminoea hydatis, Cymothoidae, Glyceridae) and 6 taxa have been found in Autumn only (Abra segmentum, Idotea baltica, Loripes lacteus, Rissoa marginata, Physa acuta, Orbinidae).

The highest seasonal variation in species number has been recorded in Narta Lagoon, with 13 taxa in Spring and 19 taxa in Autumn, while the lowest seasonal variation has been recorded in Karavasta Lagoon, with 16 taxa in Spring and 17 taxa in Autumn. In Patok, unlikely two other lagoons, the highest number of taxa has been recorded in Spring (20 taxa) and 16 in Autumn.

Taxa with the highest seasonal variations of the density were Gammarus sp. and Haplotaxidae in Patok and Narta, Ventrosia ventrosa and Cerithium vulgatum in Karavasta, Chironomidae in Karavasta and Narta, Tubificidae in Patok.

The highest seasonal variations in species composition and density have been recorded in the western parts of the lagoons (independently on the presence of macrophytes). The highest seasonal variations in species number has resulted in Station 4 of Patok (7 taxa in Autumn and 17 taxa in Spring) and in Station 1 of Narta (11 taxa in Autumn and 3 taxa in Spring). The highest seasonal variation in the density of species has resulted in Karavasta (western part).

Dominant species of macrovegetation in the three lagoons were Ruppia cirrhosa, Zostera noltii and Cymodocea nodosa. In the bottoms covered by macrovegetation there was a higher presence of the amphipod Gammarus and molluscs Ventrosia, Rissoa, Cerastoderma and Scrobicularia. In the bottoms without vegetation there was a higher presence of the oligochaetes Haplotaxidae, Tubificidae and Lumbricidae.

Conclusions

Molluscs and annelids predominate in the species composition of the macrozoobenthos of the Albanian coastal lagoons. Molluscs, crustaceans and chironomids have the highest density in the macrozoobenthic community. There is a small difference in total species number between lagoons, but a considerable difference in species composition between Patok and the two others. The highest variation of species distribution in Narta Lagoon may due to the abiotic gradients. Western parts of the lagoons are characterized by a higher seasonal variation of species composition and density in all habitat types. Further elaboration of the existing data and further complex studies will give a deeper and more detailed knowledge on the situation of macrozoobenthic guild and the environmental state of the lagoons of Albania.

Acknowledgments

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Annex 1

List of taxa found in the three lagoons. With "+" is noted the presence of the taxa.
A – Autumn; S – Spring.

Taxa	Classification	Patok		Karavasta		Narta	
		A	S	A	S	A	S
Condylactis aurantiaca	Cnidaria, Anthozoa				+		
Enoploida	Nematoda	+	+				
Cerastoderma glaucum	Mollusca, Bivalvia	+	+	+	+	+	+
Scrobicularia cottardi	Mollusca, Bivalvia	+	+	+	+	+	+
Scrobicularia plana	Mollusca, Bivalvia	+	+				
Abra segmentum	Mollusca, Bivalvia			+			
Loripes lacteus	Mollusca, Bivalvia			+			
Tapes decussatus	Mollusca, Bivalvia	+	+				
Paphia.aureus	Mollusca, Bivalvia					+	+
Ventrosia ventrosa	Mollusca, Gastropoda		+	+	+	+	
Cerithium vulgatum	Mollusca, Gastropoda			+	+	+	
Pirenella conica	Mollusca, Gastropoda			+	+	+	+
Pirenella tricolor	Mollusca, Gastropoda				+	+	
Cyclope neritea	Mollusca, Gastropoda		+	+	+	+	
Rissoa labiosa	Mollusca, Gastropoda			+	+		
Rissoa ventrosa	Mollusca, Gastropoda					+	
Pusillina radiata	Mollusca, Gastropoda			+	+	+	
Pusillina lineolata	Mollusca, Gastropoda			+	+		
Pusillina marginata	Mollusca, Gastropoda				+		
Retusa truncatula	Mollusca, Gastropoda			+	+		
Haminoea hydatis	Mollusca, Gastropoda				+		
Physa acuta	Mollusca, Gastropoda					+	
Nereidae	Annelida, Polychaeta	+	+				
Syllidae	Annelida, Polychaeta	+	+				
Phyllodocidae	Annelida, Polychaeta					+	+
Glyceridae	Annelida, Polychaeta						+
Orbinidae	Annelida, Polychaeta					+	
Naididae	Annelida, Oligochaeta			+			+
Haplotaxidae	Annelida, Oligochaeta	+	+			+	+
Tubificidae	Annelida, Oligochaeta	+	+			+	+
Lumbricidae	Annelida, Oligochaeta	+	+			+	+
Nephtyidae	Annelida, Polychaeta	+	+				+

Chironomus plumosus	Insecta, Diptera		+	+	+	+	+
Anthuridae	Crustacea, Isopoda	+	+				
Idotea baltica	Crustacea, Isopoda			+			
Cymothoidae	Crustacea, Isopoda		+				
Gammarus	Crustacea, Amphipoda	+	+	+	+	+	+
Gammaridae	Crustacea, Amphipoda	+	+				
Crangon.crangon	Crustacea, Decapoda	+	+			+	
Unidentified larva		+	+				